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Description of three new species and a new genus of Lithosiini from Dominican Republic (Lepidoptera: Erebidae: Arctiinae: Lithosiini)

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new genus;
Neotropic.

Abstract. – Three new Lithosiini species are described for Dominican Republic fauna, two in the already described genus *Boenasa* Walker, [1865]: *Boenasa davidsoni* **sp**. **n**. from Pedernales and *Boenasa keegani* **sp**. **n**. from La Vega and the third one in a new genus *Neoboenasa* **gen**. **n**. This last new species is dedicated to John Rawlins: *Neoboenasa rawlinsi* **sp**. **n**. and seems to be a scarce endemic of the high altitudes in the Sierra de Neiba. On this occasion the generotype of *Boenasa*, *Boenasa nigrirosea* Walker, [1865], is fully redescribed.

Laguerre M., 2024. – Description of three new species and a new genus of Lithosiini from Dominican Republic (Lepidoptera: Erebidae: Arctiinae: Lithosiini). *Faunitaxys*, 12(37): 1 – 9.

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Introduction

Among the Neotropical Arctiinae the Lithosiini tribe is extremely neglected and almost no modern work has been published except the papers of William D. FIELD (1950, 1951, 1952, 1964), Carroll B. KNOWLTON (1967) and Christian GIBEAUX (1983, 1988). In the Barcode of Life Database (BOLD) (RATNASINGHAM & HEBERT, 2007), 85 % of the Lithosiini Barcode Index Numbers (BIN) (RATNASINGHAM & HEBERT, 2013) are unidentified at the species level and in a large number of cases they are identified only at the tribe level. In part, this lack species-level identification is due to the many Neotropical Lithosiini genera with undescribed species, like the genus *Boenasa* Walker, [1865].

In the Caribbean the tribe has evolved in several genera, the majority of them specific of one island. For instance, the genera *Cincia* Walker, 1854 *Amplicincia* Field, 1950, *Paracincia* Field, 1950 and *Parvicinvia* Field, 1950 are endemic to Jamaica. The genus *Paramulona* Hampson, 1900 is endemic to Cuba. The genus *Mulona* Walker, 1866 is found only in the Greater Antilles and Bahamas Islands while *Lomuna* Field, 1952 is confined to Puerto Rico. On Hispaniola beside the genus *Mulona*, it is possible to find the genus *Boenasa* Walker, [1865]. This genus has been described on the basis of the very special male hindwings which are nearly completely upturned so that the underside becomes the functional upper side and vice versa. There are currently six described species of *Boenasa*: on Hispaniola there is the generotype *B. nigrirosea*

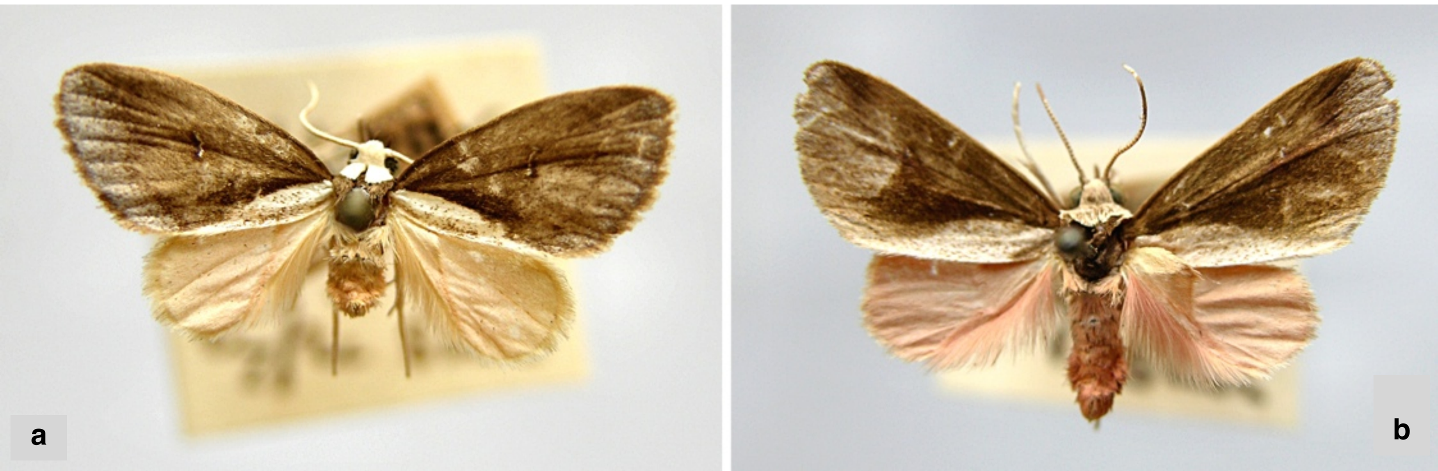

Fig. **1**. Types of *Boenasa* from USNM. **a**. *Boenasa tricolor* (Herrich-Schäffer, 1866) (= *toryca* Schaus, 1924). **b**. *Boenasa angelica* Schaus, 1924.

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Walker, [1865], *B. angelica* Schaus, 1924, *B. domingonis* Schaus, 1924 and the recently described *B. benedicti* Laguerre, 2019; in Cuba there is *B. tricolor* (Herrich-Schäffer, 1866), and *B. polyphron* (Druce, 1894) is present in Mexico (type locality: Morelia). Unfortunately for this last species the type specimen is lost and the type locality, so far removed from its congeners in the Caribbean, renders the species' generic placement extremely doubtful. *B. toryca* Schaus, 1924, described from Cuba has been put into synonymy with *Boenasa tricolor* (Herrich-Schäffer), 1866, also described from Cuba, by Becker (Becker, 2002). Finally, *B. domingonis* is known only by its female type and its habitus is noticeably different from the other species of *Boenasa*, casting some doubts on its exact generic placement. The aim of the present study is to describe three more species from the Dominican Republic, two are included within the genus *Boenasa* and the third one is classified in *Neoboenasa* **gen. n.** which will be described below.

Materials and Methods

Genitalia of both sexes were prepared by boiling abdomens for 15 minutes with 1 pellet of potash (KOH Rectapur VWR) in 5 ml of water. After being washed with water and then alcohol, eventually stained with Chlorazole black, genitalia were photographed in a natural position suspended in 95 % alcohol, then types and museum specimens were mounted in Euparal, and remaining specimens were simply stored in glycerol. Photos were taken with a CoolPix 4500 Nikon camera attached to a trinocular Nikon stereomicroscope SMZ-10A. For genitalia illustrations, resolution was enhanced using focal planes fusion technique (3 to 6 planes were used generally) with the free software CombineZM (Hadley, 2009).

Short sequences of mitchondrial DNA (COI gene), or DNA barcodes, routinely used for species discrimination and identification (Hebert & *al.*, 2003) were analyzed. DNA was extracted, amplified and sequenced at the Canadian Centre for DNA Barcoding (CCDB) in Guelph, Ontario. Tissue consisted of legs removed from dried voucher specimens in the author's collection. Details of various protocols have been described in Vaglia & *al.* (2008) and Decaëns & Rougerie (2008).

The sequences were downloaded from BOLD and aligned and analyzed using MEGA7 (Kumar *et al.*, 2016) or MEGA11 (Tamura *et al.*, 2021) to build various distance trees. Bootstrap values (Felsenstein, 1985) were used to estimate branch support: they were calculated in MEGA7 after 1000 random replications. Distance calculations were performed using the Kimura 2-parameter (K2P) method in MEGA7 (Kimura, 1980) including all sites, with the pairwise deletion option and assuming both a homogeneous pattern of divergence among lineages and a uniform rate of substitutions among sites.

Repository abbreviations are as follows:

CMNH	Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, USA.
MNHN	Muséum National d'Histoire Naturelle, Paris, France.
MNHU	Museum für Naturkunde, Humboldt-Universität, Berlin, Germany.
NHM	Natural History Museum, London, England, United Kingdom.
USNM	United States National Museum, Smithsonian Institution, Washington D. C., U. S. A.
MLC	Personal collection of Michel Laguerre, 33850 Léognan, France.

Abbreviations used:

FWL = ForeWing Length (from base to apex)
WS = WingSpan

Results

Redescription of the genus ***Boenasa*** Walker, [1865]

The generotype is *nigrorosea* Walker, [1865] (Fig. 2) described originally from Santo Domingo. The male holotype is housed in NHM and its genitalia are shown in Fig. 3 below. Moreover this specimen has been sequenced and constitutes the BIN BOLD:ABW9270.

Generally speaking, the genus contains small to tiny species with dark chocolate brown forewings very often with a creamy spot at the end of cell, and pinkish red hindwings, sometimes bordered by black. The females display classical and not upturned hindwings. Male genitalia are symmetrical, with a long and thin uncus, evenly bent downwards. Aedeagus is short, straight and cylindrical with a single lobed vesica adorned with bunches of teeth.

Redescription of ***Boenasa nigrorosea*** Walker, [1865]
BIN = BOLD: ABW9270

Material examined

Dominican Republic

1 ♂, Pedernales, Piste de Los Arroyos à El Aguacate, PK 5.2, 11-VIII-2007, 1990 m, 18°18.269' N 71°43.496' W, J. Haxaire & O. Paquit *leg*. Dissected Gen. ML3878 (light blue manuscript label) and sequenced sample ID MILA 1794 (yellow printed label), BOLD Process ID ARCTD1281-19.

1 ♀, Independencia, Sierra de Baoruco National Park, Route Puerto Escondido à Pedernales, Km 41.5, 12-V-2004, 1620 m, B. Vincent *leg*. All in MLC.

Diagnosis. – A small species with almost black forewings with a narrow red subterminal band and pinkish-red hindwings thinly bordered by black.

Male (Fig. 2 on top)

FWL = 11 mm and WS = 23 mm. – *Head*. Antennae ciliate, black with the last third yellowish. Palpi black. Vertex yellow with reddish hairs. Patagia yellow, largely interspersed with reddish hairs. – *Thorax*. Thorax, including tegulae, black. – *Abdomen*. Abdomen upperside covered by bright red hairs, except portion of first abdominal tergum with gray-brown scales. Abdomen venter black in median area, with a few red scales on venter at posterior end. Legs blackish with the tarsi brown. – *Wings*. Forewings black, a tiny red dot hardly visible at the end of cell. A subterminal red streak roughly parallel to termen from below apex to above tornus. Hindwings plain pinkish red with a thin brownish black margin on costa and termen, nearly completely upturned with venter facing dorsally and vice versa. The tornus border with very long pinkish red hairs. Below similar to upperside, except the forewings lighter and the subterminal reddish streak hardly visible.

Genitalia male (Fig. 3)

Genitalia symmetrical. Uncus narrow and long, almost cylindrical, evenly bent downwards, the tip slightly pointed. Valvae very short, not reaching the base of uncus, slightly bent inwards, the extremity bifid. At the base of valvae a sharp tooth pointing inwardly. Juxta very slightly sclerotized. Presence of a narrow transtilla. Vinculum evenly rounded with a small saccus. Aedeagus cylindrical and straight with a conical vesica and three patches of cornuti: the first one near posterior edge of aedeagus with a line of six small cornuti, the second just before the middle of the vesica with 7–8 strong cornuti and the last one in the last third with 4–5 long and strong cornuti.

Female (Fig. 2 below)

(FWL = 12 mm and WS = 25 mm). Similar to male but slightly larger and without upturned hindwings. The subterminal red band on forewings is narrower. On hindwings the background color is darker and the black margin is wider, especially on costa. Below on forewings the background color is lighter, more brown and the red subterminal band is faintly visible. The fore tarsi are beige.

Early stages. – Unknown.

Distribution. – Presently known from high altitude localities in the Sierras in the Southern part of the Dominican Republic.

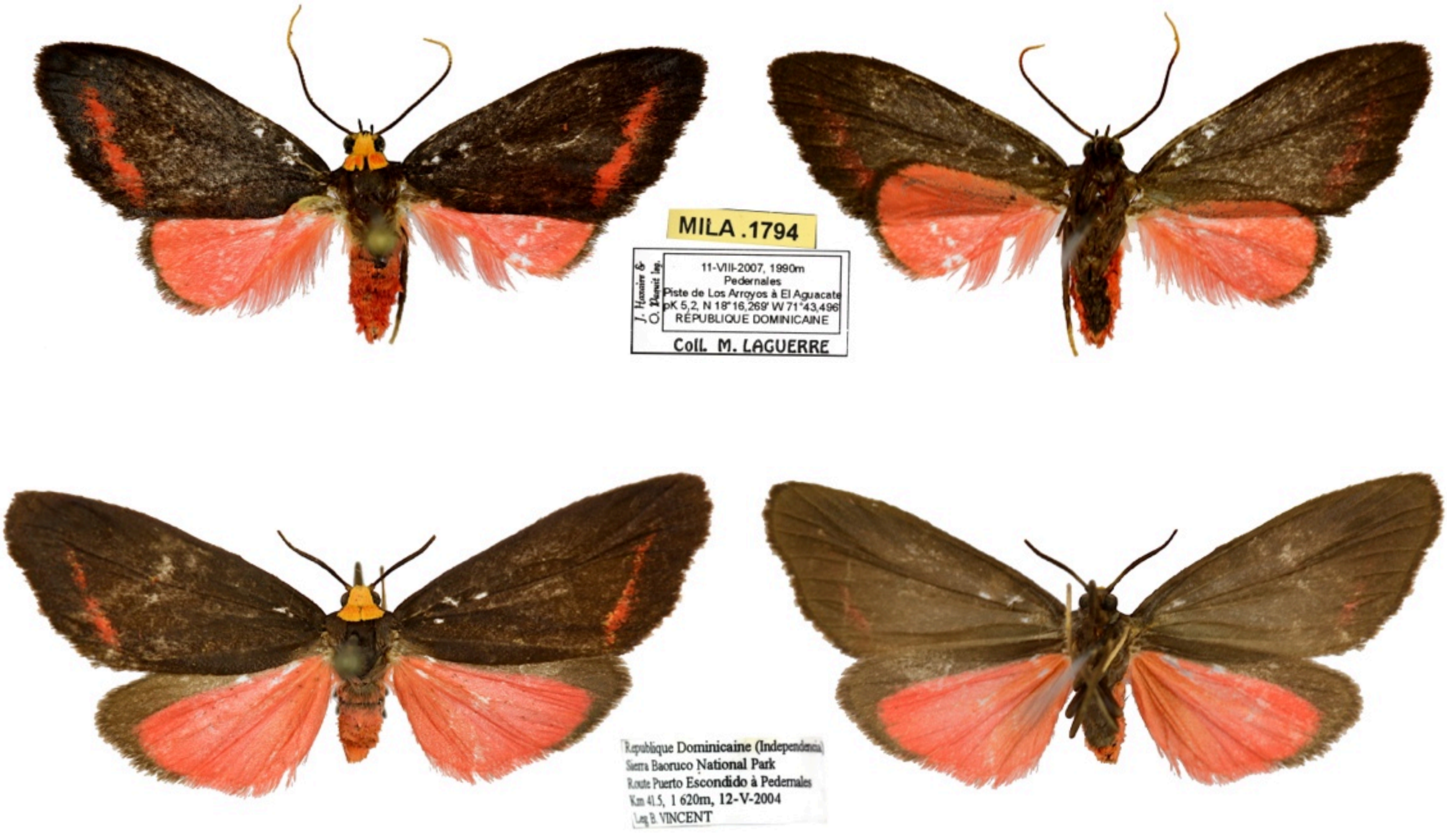
MILA .1794
11-VIII-2007, 1990m
Pedernales
Piste de Los Arroyos à El Aguacate
pK 5,2, N 18°16,269' W 71°43,496'
RÉPUBLIQUE DOMINICAINE
J. Haxaire & O. Dumit leg.
Coll. M. LAGUERRE
République Dominicaine (Independencia)
Sierra Baoruco National Park
Route Puerto Escondido à Pedernales
Km 41,5, 1 620m, 12-V-2004
Leg B. VINCENT

Fig. **2**. A pair of *Boenasa nigrirosea* Walker, [1865]. Male on top, female below, upperside on left and underside on right. Labels not to scale.

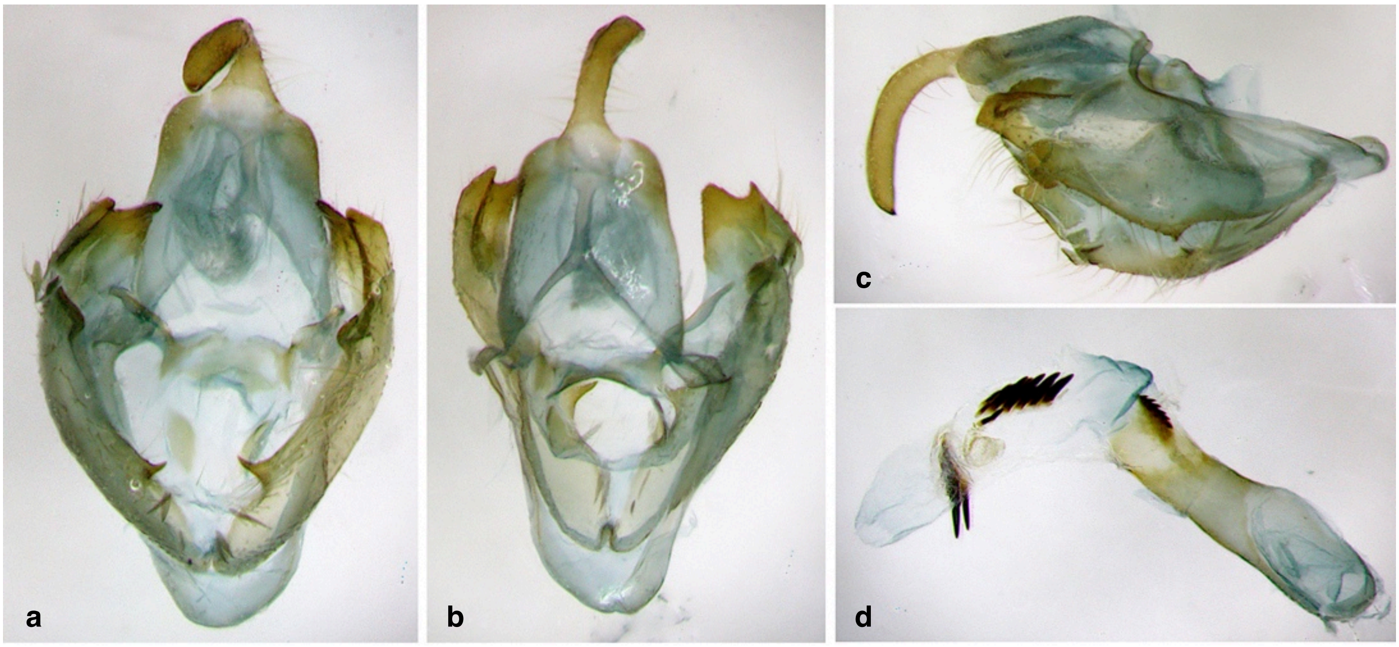

Fig. **3**. Male genitalia of *Boenasa nigrirosea* Walker, [1865]. **a**. Ventral view. **b**. Dorsal view. **c**. Lateral view. **d**. Aedeagus with everted vesica.

Description of ***Boenasa davidsoni*** Laguerre **sp**. **n**.

ZooBank: https://zoobank.org/8AB308A8-CC3A-45B0-ADEC-0543CB0EC040

Holotype, ♂, Dominican Republic, Pedernales, La Abeja, 38 NNW Cabo Rojo, (18°09' N 71°38' W). 1160 m, 13-VII-1987, J.E. Rawlins & R.L. Davidson *leg*. Dissected Gen. ML3874 (light-blue manuscript label). In CMNH.

Paratypes, **4** ♂ **& 3** ♀, Dominican Republic, same data as holotype. In CMNH.

Diagnosis. – A small species with chocolate brown forewings with a pinkish basal streak. Hindwings unmarked and light pink. Head and collar pinkish-cream and strongly contrasting.

Male (Fig. 4 on top)

FWL = 7 mm and WS = 15 mm. – *Head*. Antennae thin and ciliate, light pink. Palpi black. Vertex pinkish beige. Patagia pinkish beige with some reddish hairs. – *Thorax*. Thorax including tegulae brownish black. – *Abdomen*. Abdomen covered with orange red hairs, darker towards base. – *Wings*. Forewings chocolate brown with a pink streak from base to mid internal border. A thin blackish line on the termen margin. Hindwings plain pinkish red with long hairs on the anal border, nearly completely upturned with venter facing dorsally and vice versa. Below similar to upperside: forewings dark brownish with a large reddish patch on disk and hindwings plain pinkish red.

Genitalia male (Fig. 5)

Genitalia symmetrical. Uncus very long and narrow, with a pointed tip, evenly bent downwards. Valvae extending posteriorly slightly beyond base of uncus, ovoid with sharp denticulate extremity at cucullus pointing dorsally. Vinculum slightly concave, no saccus. Presence of a long subscaphium slightly sclerotized. Aedeagus short and cylindrical, thinly sclerotized, vesica conical very minutely spiculate.

Female (Fig. 4 below)

FWL = 9 mm and WS = 19 mm. Similar to male but larger and without upturned hindwings. Below on forewings the reddish patch is suffused with brownish scales.

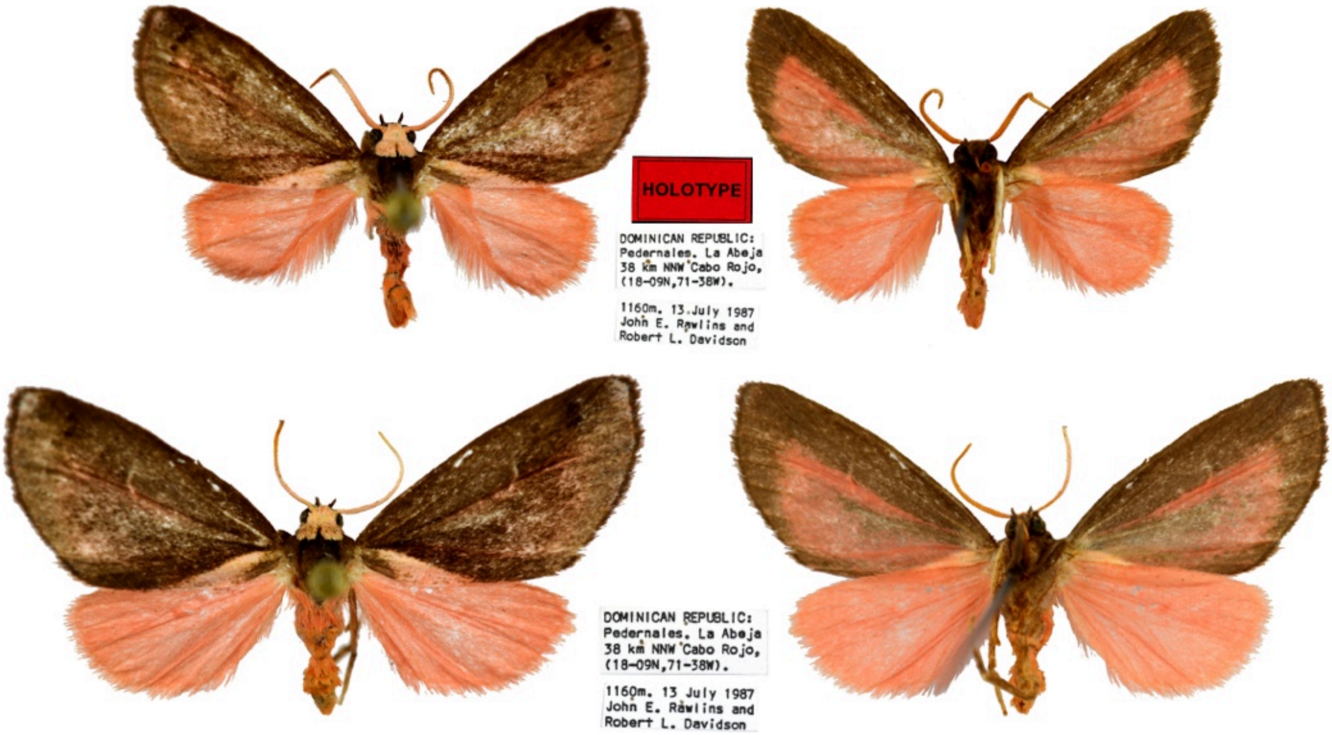

Fig. **4**. A pair of *Boenasa davidsoni* **sp**. **n**. Male holotype on top, female paratype below, upperside on left and underside on right. Labels not to scale.

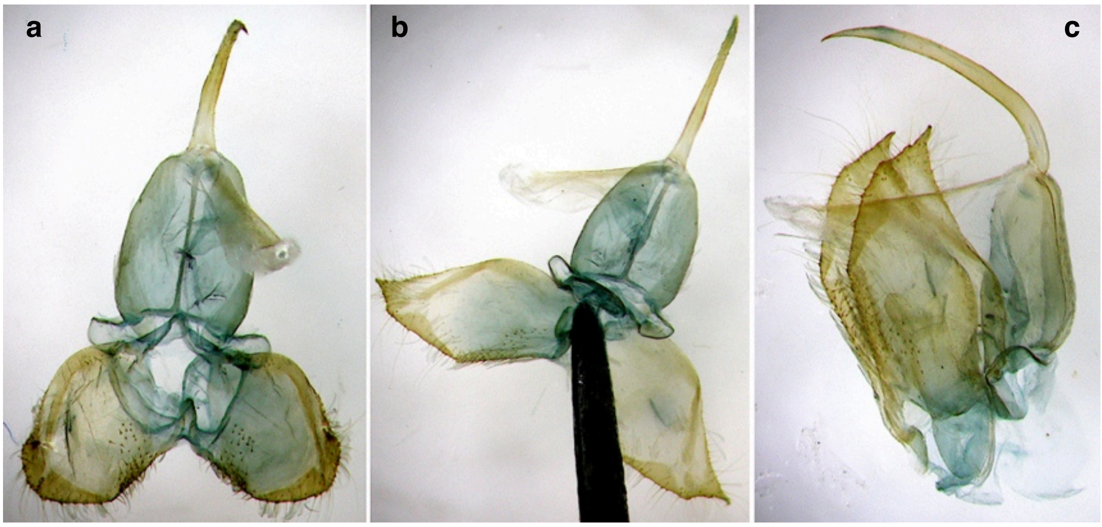

Fig. **5**. Genitalia of the holotype of *Boenasa davidsoni* **sp**. **n**. **a**. Ventral view. **b**. Dorsal view. **c**. Lateral view with aedeagus in position.

Etymology. – Named in honor of Robert L. Davidson who collected a large part of the studied material and for his unlikely contributions to lepidopterology by spreading more moths than any other coleopterist.

Early stages. – Unknown.

Distribution. – Presently known from medium altitudes localities in the southern part of the Dominican Republic. The species is uncommon across its range.

Description of ***Boenasa keegani*** Laguerre **sp**. **n**.

ZooBank: https://zoobank.org/C2FBDC0F-A938-4DEF-81FD-B6C963504DA3

Holotype, ♂, Dominican Republic, La Vega, 15 km N. Jarabacoa, 240 m, 21-VII-1987, J.E. Rawlins & R.L. Davidson *leg*. Dissected Gen. ML3875 (light-blue manuscript label). In CMNH.

Paratypes

Dominican Republic

3 ♂ & **2** ♀, Baoruco. Sierra de Neiba, Los Guineos on upper Río Colorado, 18°35' N 71°11' W, 630 m, 11.12-VIII-1990, J. Rawlins & S. Thompson *leg*. Mesic riparian woodland.

5 ♂ & **1** ♀, Azua, East side of crest, Sierra Martín García, 7 km WNW Barrero, 25.26-VII-1992, 860 m, 18°21' N 70°58'W, C. Young, R. Davidson, S. Thompson, J. Rawlins *leg*. 11 ♂, San Juan, 7 km N. Arroyo Cano, 1 km S. Los Frios, 1-IX-1995, 1120 m, 18°52' N 71°01' W, J. Rawlins, G. Onore, R. Davidson *leg*.

1 ♀, Elias Piña, North slope of Sierra de Neiba, 2 km SW Canada, 7 km WSW Hondo Valley, 29-VIII-1995, 980 m, 18°42' N 71°45' W.

1 ♂, La Vega, 4.1 km SW El Convento, 14-XI-2002, 1710 m, 18°50.37' N 70°42.48' W, W.A. Zanol, C.W. Young, C. Staresinic, J. Rawlins *leg*.

3 ♂ & **8** ♀, La Vega, 15 km N Jarabacoa, 21-VII-1987, 240 m, J. Rawlins, R. Davidson *leg*.

1 ♂ & **1** ♀, La Vega, 5 km SSE Jarabacoa, 25-VII-1987, 640 m, J. Rawlins *leg*.

6 ♀, La Vega, Bayacanes, 24-VII-1987, 120 m, J. Rawlins, R. Davidson *leg*. In CMNH.

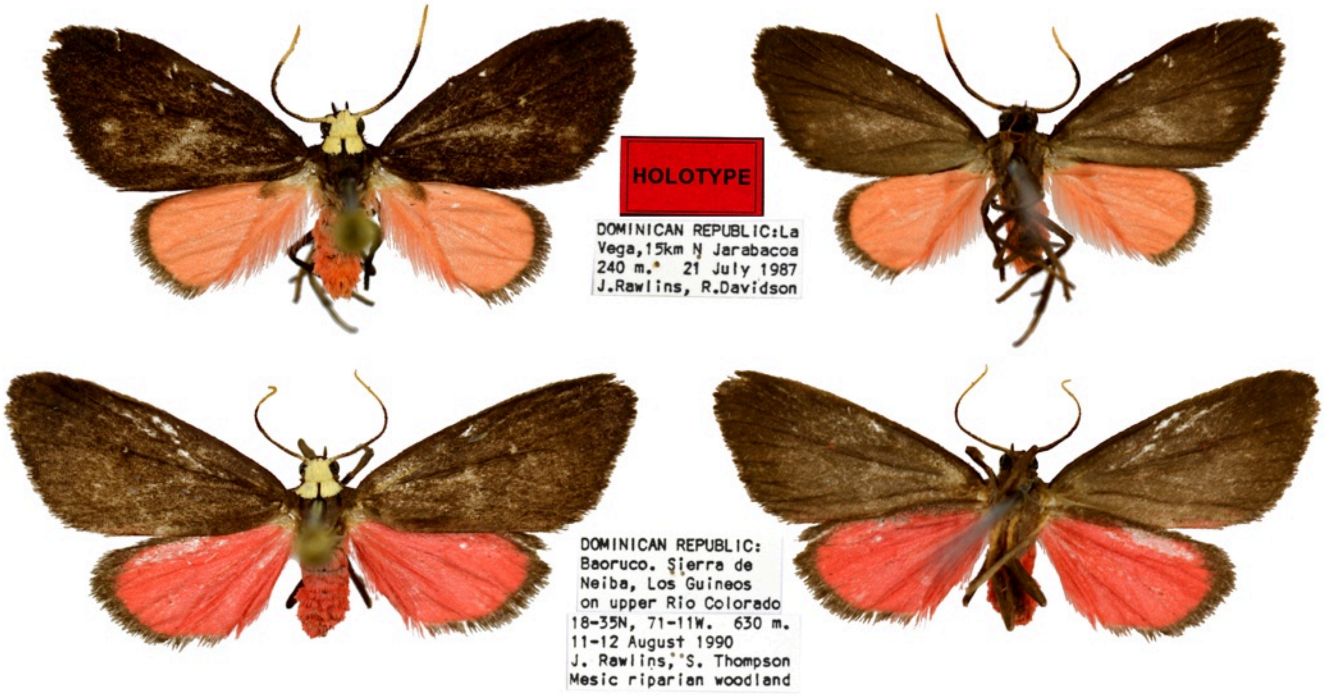

Fig. **6**. A pair of *Boenasa keegani* **sp**. **n**. Male holotype on top, female paratype below, upperside on left and underside on right. Labels not to scale.

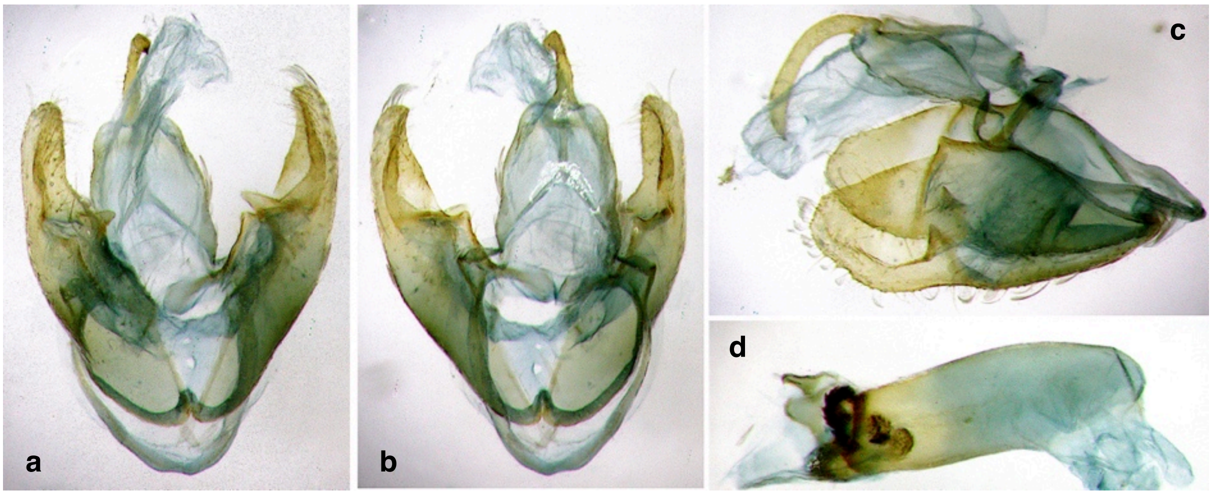

Fig. **7**. Genitalia of the holotype of *Boenasa keegani* **sp**. **n**. **a**. Ventral view. **b**. Dorsal view. **c**. Lateral view. **d**. Aedeagus with vesica inside.

Diagnosis. – A small species with unmarked black forewings and hindwings bordered partially by thin black area, pinkish-orange in males or bright red in females. The head dorsum and collar are strongly contrasting creamy-white.

Male (Fig. 6)

FWL = 7 mm and WS = 15 mm. – *Head*. Antennae thin and ciliate, black with the first 5-6 antennomeres and terminal 3rd of antennae creamy yellow. Palpi black. Vertex creamy white. Patagia creamy white. – *Thorax*. Thorax and tegulae black, thorax venter brownish black. – *Abdomen*. Abdomen covered with orange red hairs. Legs dark brown. – *Wings*. Forewings plain black. Hindwings plain pinkish orange with long hairs on the anal border and a thin black at least partial margin on termen and costal margin, nearly completely upturned with venter facing dorsally and vice versa. Below similar to upperside.

Variations. In some of the specimens housed in Carnegie Museum there is a red mark near the tornus in the subterminal area, and in other specimens a light-brown subterminal band.

Genitalia male (Fig. 7).

Genitalia symmetrical. Uncus long and narrow, with a pointed tip, evenly bent downwards. Valvae short, extending posteriorly slightly beyond base of uncus. Valvae strong, narrowed in the distal half after a strong toothlike process of the distal sacculus pointing inward towards the central body axis of the moth. Presence of a membranous subscaphium. Vinculum evenly rounded with a small saccus. Aedeagus short and cylindrical. Vesica with a row of cornuti and two small patches of spicules.

Female (Fig. 6)

FWL = 8 mm and WS = 15 mm. Similar to male but larger and without upturned hindwings. The forewings background color is lighter, dark brown whereas the hindwings background color is darker, bright red, the thin black border present also on costa.

Etymology. – Named in honor of Kevin Keegan, Insect Collection Manager at Carnegie Museum of Natural History who provided the totality of the new material.

Early stages. – Unknown.

Distribution. – Presently known from low altitude localities in the northern part of the Dominican Republic. Common across its range.

The third species exhibits also the very special upturned hindwings but the size is noticeably larger, the color pattern is not chocolate brown and pink but plain dull brown and the male genitalia are no longer symmetrical but largely asymmetrical. For all these reasons we decided not to include it in the genus *Boenasa* and we describe a new genus below under the name *Neoboenasa* **gen**. **n**. to recall the specificity of the hindwings shape.

Description of the genus ***Neoboenasa*** **gen**. **n**.

ZooBank: https://zoobank.org/C2FF8AC9-8AB3-482C-9289-0B0CA0326845

Type species: *Neoboenasa rawlinsi* **sp**. **n**. by present designation.

Diagnosis. – Small and dull colored species, characterized in males by the nearly completely upturned hindwings. Except the hindwings, the sexual dimorphism is slight.

Description. – Larger species (FWL around 19-20 mm) with drab colors. The forewings are largely darker than the hindwings which exhibit in males a characteristic folding similar to males in the genus *Boenasa*. The genitalia are largely asymmetrical with the left valva exhibiting a strong, long and undulated costa almost reaching the tip of uncus. The two valvae are clearly curved inwards with pointed extremities. Aedeagus straight, cylindrical with a short caecum penis and a vesica bearing a terminal bunch of cornuti.

Description of ***Neoboenasa rawlinsi*** Laguerre **sp**. **n**.

ZooBank: https://zoobank.org/52AB478F-2B03-4614-B163-FA8FA32B6326

Holotype, ♂, DOMINICAN REPUBLIC, Independencia, Sierra de Neiba just south of crest, 5 km WNW Angel Feliz, 1780 m, 18°41' N 71°47' W, 13.15-X-1991, J.E. Rawlins, R.L. Davidson, C. Young & S. Thompson *leg*. Cloud forest. Dissected Gen. ML3870 (light-blue manuscript label). In CMNH.

Paratypes

DOMINICAN REPUBLIC

1 ♀, Independencia, Sierra de Neiba at crest, 5.5 km WNW N Angel Feliz, 1800 m, 18°41' N 71°47' W, 15-X-1991, R.L. Davidson, C. Young, S. Thompson & J.E. Rawlins *leg*. Cloud forest. In CMNH.

Diagnosis. – A large drab species, well characterized in male by the very specialized hindwings. The asymmetrical male genitalia are diagnostic.

Male (Fig. 8).

FWL = 18 mm and WS = 35 mm. – *Head*. Antennae thin and ciliate, brown in the first half then yellowish beige, below almost entirely yellowish beige. Palpi black. Vertex, tegulae, patagia and thorax, unmarked dark brown. – *Abdomen*. Abdomen upperside covered with brownish beige hairs. Abdomen below similar to upperside. Legs brown with lighter tarsi. – *Wings*. Forewings plain brown with a faint whitish laterally pointed chevron at the end of cell. Hindwings plain beige slightly suffused with brownish scales. Underside plain brownish mottled with beige scales, lighter on hindwings disk.

Genitalia male (Fig. 9)

Genitalia asymmetrical. Uncus long, narrow, covered with hairs and bent downwards in the last third.Valvae reaching almost the tip of uncus. Right valva with basal half large and terminated with an inward tooth, then strongly narrowed to a curved blade with pointed tip and long setae. Starting from base a sclerotized short cylindrical process with a blunt and spiculate extremity. Left valva in two parts. The upper part identical to the right one: base large with an inward tooth and then abruptly narrowed to a curved blade with pointed extremity. Below, the cylindrical process, slightly sinuate, very long, almost reaching the tip of uncus, with a blunt spiculate extremity. Juxta ovate with a deep median notch. Aedeagus cylindrical with a long caecum penis. Vesica short and perpendicular, slightly spiculate and ending with a bunch of 10-12 long and sclerotized spines.

Female (Fig. 8).

FWL = 19 mm and WS = 37 mm. Similar to male, but larger and with non-upturned hindwings. Forewing background color lighter, the small clear mark at the end of cell more open. Hindwing background color noticeably dusted with dark scales more densely toward termen.

Etymology. – After John Rawlins (1950–2021), former head curator of the Section of Invertebrate Zoology at the CMNH who collected a large part of the typical series, in honor of his very large contribution to our understanding the Dominican Republic Lepidoptera fauna.

Early stages. – Unknown.

Distribution. – Presently known only from the high altitude localities in the Sierra de Neiba in the Dominican Republic. The species is very rare across its range.

Except for the larger size (wingspan 37 mm against only 13 mm) this species is reminiscent of *Boenasa domingonis* Schaus, 1924 (see type in Fig. 10). Unfortunately the holotype (and only known specimen) is a female and it is not possible to see the specific hindwings shape which is present only in males. *Boenasa domingonis* may prove to belong in *Neoboenasa*, but until a male can be dissected to assess its genitalia symmetry it should remain in *Boenasa*.

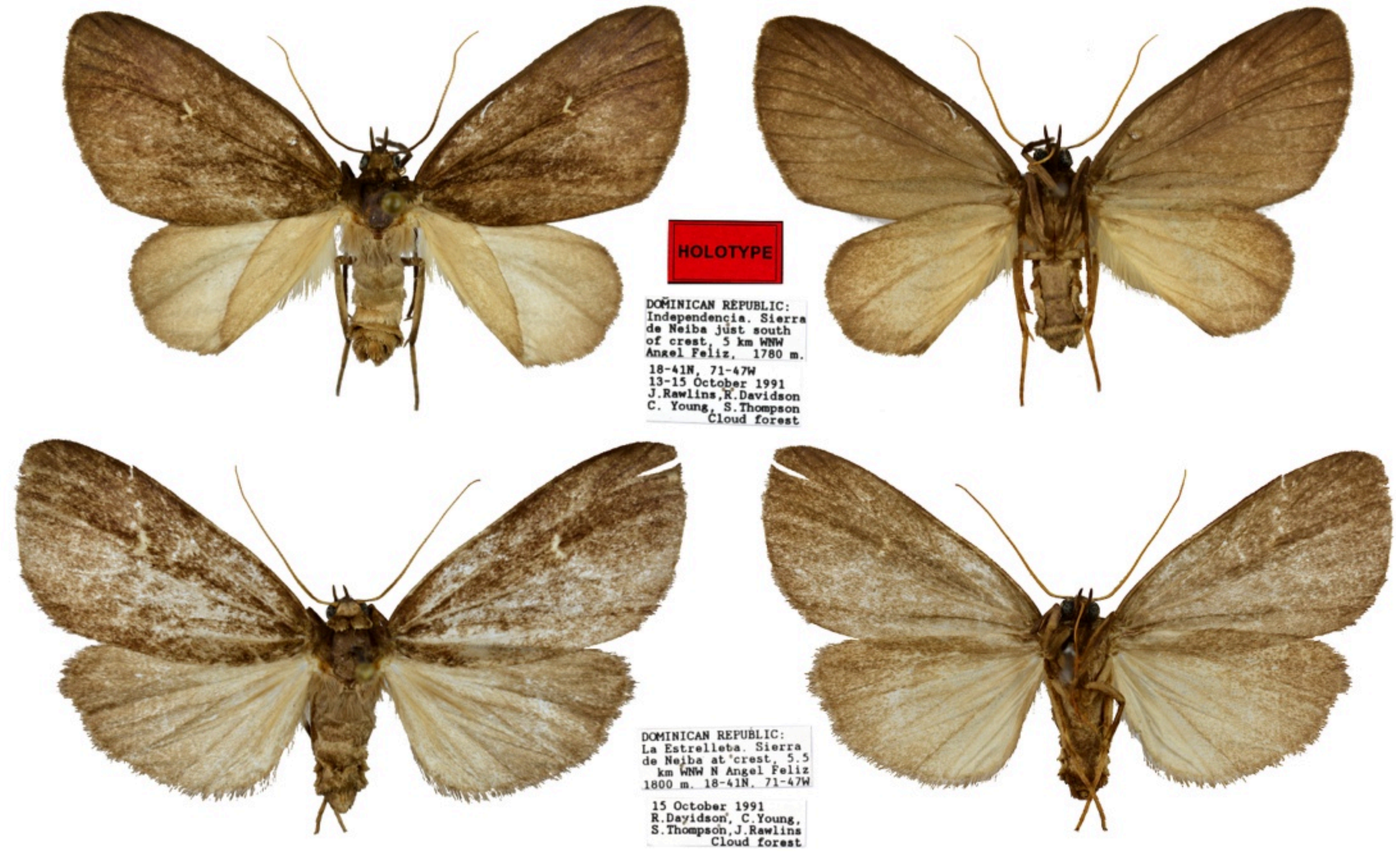

Fig. **8**. A pair of *Neoboenasa rawlinsi* **sp**. **n**. Male holotype on top, female paratype below, upperside on left and underside on right. Labels not to scale.

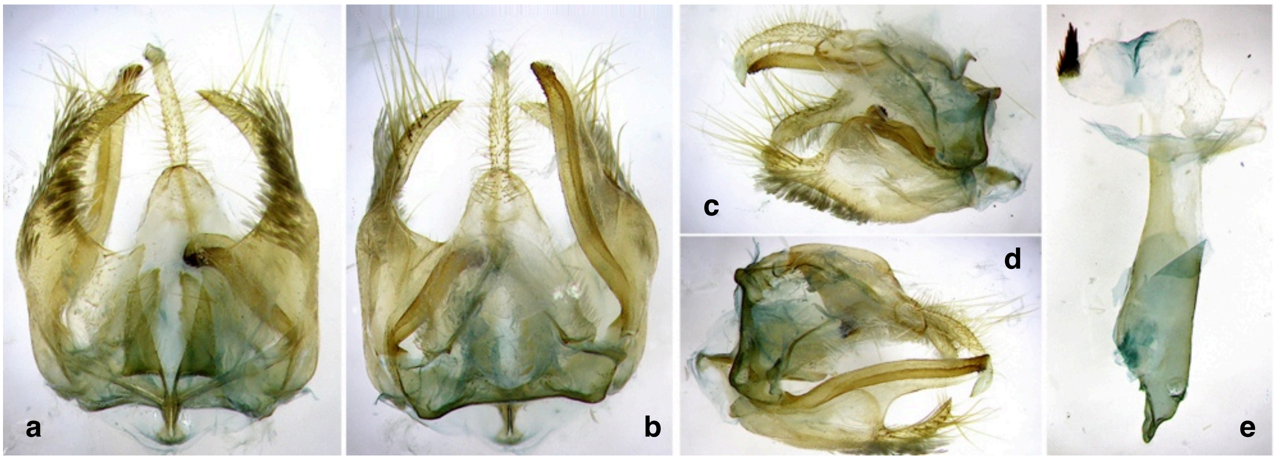

Fig. **9**. Genitalia of male holotype of *Neoboenasa rawlinsi* **sp**. **n**. **a**. Ventral view. **b**. Dorsal view. **c**. Right lateral view. **d**. Left lateral view. **e**. Aedeagus with everted vesica.

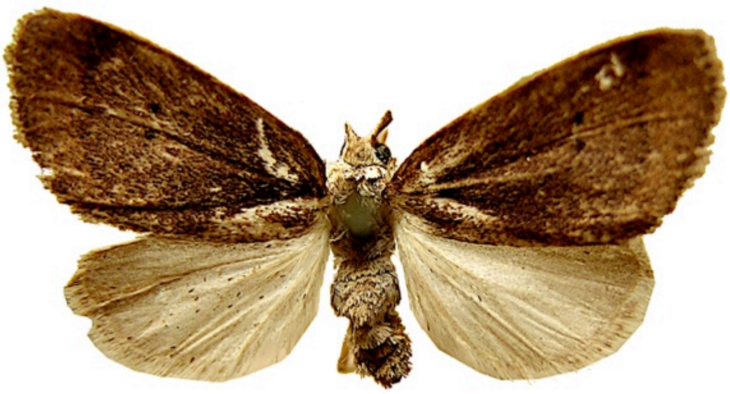

Fig. **10**. Holotype female of *Boenasa domingonis* Schaus, 1924 housed in USNM.

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Résumé

Laguerre M., 2024. – Description de trois nouvelles espèces et un nouveau genre de Lithosiini pour la faune de la République Dominicaine (Lepidoptera: Erebiidae: Arctiinae: Lithosiini). *Faunitaxys*, 12(37): 1 – 9.

Trois nouvelles espèces de Lithosiini sont décrites pour la faune de la République Dominicaine, deux dans le genre déjà décrit *Boenasa* Walker, [1865] : *Boenasa benedicti* **n. sp.** de Pedernales et *Boenasa keegani* **n. sp.** de La Vega et la troisième espèce est décrite dans un nouveau genre *Neoboenasa* **n. gen.** Cette dernière espèce est dédiée à John Rawlins : *Neoboenasa rawlinsi* **n. sp.** et semble être un rare endémique des hautes altitudes dans la Sierra de Neiba. A cette occasion, le générotype du genre *Boenasa*, *Boenasa nigrirosea* Walker, [1865] est complètement redécrit.

Mots-clés. – Arctiinae, Lithosiini, *Boenasa*, *Neoboenasa,* COI, taxonomie, systematique, description, nouvelles espèces, nouveau genre, Néotropical.

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Volume 12, Numéro 37, Juillet 2024

SOMMAIRE

Description de trois nouvelles espèces et un nouveau genre de Lithosiini pour la faune de la République Dominicaine (Lepidoptera: Erebiidae: Arctiinae: Lithosiini).

Michel Laguerre . . . . 1 – 9

CONTENTS

Description of three new species and a new genus of Lithosiini from Dominican Republic (Lepidoptera: Erebidae: Arctiinae: Lithosiini).

Michel Laguerre . . . . 1 – 9

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Cyclura ricordi, on Cabritos Island, Dominican Republic.

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Michel Laguerre : Fig. 1-10.
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